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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPTEMBER 12, 1942

Nursery for War Birds

See Page 168

A SCIENCE SERVICE PUBLICATION

Do You Know?

Thiamin or vitamin B_1 was first synthesized in 1936.

Military *surgeons* were first given rank as officers in 1847.

By evaporation, an average *oak* loses about 187 gallons of water per day.

All known *war gases* contain one of the halogens such as chlorine, bromine, iodine.

The *cowbird*, though it builds no nest, is related to the Baltimore oriole which is a famous weaver.

The *Aleutian Islands* are treeless, fog-bound, volcano-studded mountain tops protruding from the sea.

At least 26 species of wild animals in the United States have been proved capable of being infected with *plague* organisms.

Upholstery made from a new *plastic fabric* is non-porous, hence resistant to food stains, dirt, rain, oils, greases, and even chewing gum.

The United States is the leading *salt* producer of the world, with 28% of a total estimated at approximately 35,000,000 metric tons annually.

The value of *gold* produced from Alaskan mines in 1940 marked an all-time high, surpassing even that of the boom days of the great Alaska gold rushes.

Question Box

Page numbers of Questions discussed in this issue:

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

England's *fishery products* have dropped to 20% of the prewar catch.

The *otter* is such a good swimmer it can overtake almost any fish in the water.

Bacteria in the intestine are able to form nicotinic acid, vitamin K, riboflavin, and other vitamins.

Male *gnats* usually refrain from attempting to draw blood, and confine their diet to the nectar of flowers.

Nearly $500,000 worth of *mink* skins are exported from Alaska each year.

Corn is the largest crop of the United States, with forest products a close second.

Plants that capture insects can manufacture their own food when they fail to catch enough animal food.

Glass bearings no bigger than the head of a pin are replacing imported synthetic jewels for industrial jobs.

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CHEMISTRY

New Products Envisioned

Postwar automobiles may burn gasoline of 150 octane rating. Lighter building materials predicted. Recent advances reported to American Chemical Society.

➤ THE POSTWAR automobile will burn gasoline of 150 octane rating, and it will never be necessary for the filling station attendant to put more water in the radiator because the cooling system will be permanently sealed. When you get home from your ride, you'll put the car in a garage with plastic-and-plywood walls and a stainless steel roof.

Your house will be built of the same materials, strong yet so light that two men will be able to lift the whole wall of a room as they put it up.

These are items from a vision of the future presented before the meeting of the American Chemical Society at Buffalo, by Dr. Charles M. A. Stine, vice president of E. I. du Pont de Nemours and Company. They aren't just dreams, he explained; the things actually exist now, at least on an experimental basis, but are at present absorbed into the war effort.

Other new accomplishments in scientific technology were listed by Dr. Stine —glass that is unbreakable, glass that will float, wood that won't burn, shoes that contain no leather, window screens without wire, machinery bearings not made of metal.

Post-victory production of consumer's goods will reach heights undreamed of in prewar days, the speaker predicted. We have built an immense industry that turns out more light metal in a year than was formerly produced in a decade, with corresponding volumes in such things as special steels, plastics, synthetic fabrics, fuels.

Having seen how abundantly we can produce for war, the American people will insist on abundance in time of peace, Dr. Stine forecast. Slums must be cleared away, he declared; the space they leave should not be filled with other buildings, but put to use as close-in airfields. Better nutrition for everyone, based on recent researches in food chemistry, is imperative for the maintenance of a population of high industrial productivity.

"No doubt, some will become alarmed over the possible displacement of old materials and old industries," Dr. Stine admitted. "Changes of a drastic nature are inevitable but they seldom result in the hardships that the timid predict . . . . Let our swords be mighty, and mighty indeed will be our plowshares."

Science News Letter, September 12, 1942

Flours Help Replace Meat

➤ MEATLESS DAYS, even whole meatless months in an emergency, need have no nutritional terrors, if a supply of soybean, cottonseed or peanut flour is available, the American Chemical Society was told by Dr. Theodore F. Zucker and Dr. Lois Zucker of Columbia University. These flours, which are made from the seeds after the oil has been extracted, are very rich in protein and certain vitamins, so that they should prove highly valuable as additions to ordinary wheat flour, making bread a more nearly balanced diet.

It is possible to make a meatless sandwich just by buttering two pieces of this mixed-flour bread and slapping them together. The "meat" is invisibly present, incorporated in the bread itself.

Both soybean and cottonseed flours have distinctive (*Turn to Page 170*)

MEDICINE

Symptoms May Be Wrongly Blamed on Blood Pressure

➤ A GOOD many people afflicted with headaches, nervousness, cold hands and feet, lack of energy and a tired feeling plus a low blood pressure are likely to blame their symptoms on the low blood pressure. In fact, says Dr. Thomas M. Durant of Philadelphia, they often may have been helped to that idea by their physician.

Generally, the patient does not know he has a low blood pressure until he goes to his doctor for relief of his headaches, fatigue and other symptoms.

STAR MAKER—Bausch and Lomb has built a new star projector for use by Navy aviators. Men are taught the position and degree of brightness of 145 navigational stars which are projected on the spherical dome. Stars appear realistically in the sky through a period corresponding to a 24-hour cycle, which speeds up instruction. The instrument can be used in the daytime when no stars are visible and can be operated at night when bad weather obscures the stars outside.

When no other cause for the symptoms can be discovered, both patient and doctor are likely to blame them on the low blood pressure.

Many a person with low blood pressure, however, is "in good physical trim" and "robust health." The well-trained athlete is a typical example of a person with low blood pressure who has no symptoms or complaints, Dr. Durant points out in a report to the Medical Society of the State of Pennsylvania.

The nervous, tired low blood pressure patient is also generally underweight and leads a sedentary life, taking very little exercise.

In most cases these patients can be relieved of their headaches, nervousness, cold hands and feet and tired feeling by "faithfully indulged-in graduated exercises and dietary measures to correct the weight deficiency," Dr. Durant declares.

Science News Letter, September 12, 1942

INVENTION

Cultivate Germs to Combat Harmful Japanese Beetles

➤ THE JAPANESE beetle and similar insect enemies are likely to have a bad time of it in the future. Two deadly micro-organisms which attack the larvae of these insects, producing milky disease, can be cultivated, rapidly multiplied and preserved by a method described in U. S. patent 2,293,890, issued to Samson R. Dutky of Moorestown, N. J.

The inventor has assigned the right to manufacture and use his invention to the United States government without payment of royalties.

The two micro-organisms that cause milky fever were described by the inventor in 1940 and named by him *Bacillus popilliae* and *Bacillus lentimorbus*. They are found in the blood of larvae having the disease. The blood is extracted and dried, in which condition the spores of the bacteria will remain alive and virulent, the inventor says, for at least four years.

To multiple the supply, the spores are separated from the dried blood by delicate processes and injected into the blood of healthy larvae which are then put into an incubator. In 10 to 12 days, the inventor states, the spores injected are multiplied 1,000-fold.

In this way a plentiful supply can be obtained and preserved against future invasions of the Japanese beetle and his like.

Science News Letter, September 12, 1942

MEDICINE

Combating Syphilis

Ten-hour syphilis treatment tried experimentally. But six-week treatment available in 50 clinics is considered promising to replace standard 18-month schedule.

➤ A TEN HOUR treatment for syphilis, major disease of war and peace, is being tried experimentally on a few patients in the early stages of the disease. Both arsenicals and artificial fever are used in this one-day treatment.

Now in practical use in over 50 clinics, including government hospitals, are six to ten-week treatments given thousands of patients.

These are promising improvements over the old standard treatments. Eighteen long months was the time needed to cure this venereal disease until medicine's new offensive achieved these new results.

Authorized details of the one-day syphilis treatment practiced by Dr. Walter M. Simpson, Dr. H. Worley Kendell and Dr. Donald L. Rose of Dayton, Ohio, may now be given with the cooperation of the U. S. Public Health Service which is publishing the scientific paper in its technical publication, Venereal Disease Information.

Ehrlich's "magic bullet," arsenic, in the form of Mapharsen, is combined with 106-degree man-induced fever in the Dayton treatment. That is the trick of the speedy action allowing, if the first few successes are continued, one day of treatment to do as much as 540 days have done in the past.

Premature and over-enthusiastic disclosure of the experimental work caused the scientists and the U. S. Public Health Service to release details at this time. The patient is given a preliminary dose of bismuth, long a part of standard treatments for syphilis. After injection into his muscles of four grains of bismuth subsalicylate, he is put into the fever cabinet early in the morning. As soon as the heat of the cabinet has raised his temperature to 106 degrees Fahrenheit, he is given his first hypodermic injection of Mapharsen. Three more injections of this drug are given at the end of the third, sixth and ninth hours of fever. Total amount of the arsenical given the first patients varied from 120 to 240 milligrams. After the tenth hour of fever, the treatment is finished, though the patient is kept in the hospital for a few days for observation and tests.

The Dayton research team do not claim a one-day cure for syphilis. In fact, they do not even announce the development of a new method for treating syphilis in one day. Instead of any such claim, they specifically state:

"It should be emphasized that it is not the purpose of this communication to present a new method of therapy. The number of patients is small and insufficient time has elapsed following the administration of the therapy to permit adequate clinical evaluation of the method employed."

Their aim, they state, is to present experimental data on the value of quantitative rather than merely qualitative tests for syphilis under various methods of treatment. Qualitative tests, they point out, are "yes" or "no" tests. They show either that a patient has syphilis or that he has not got it.

Quantitative tests, devised by Dr. Reuben L. Kahn, of the University of Michigan, show not only whether the patient has syphilis but also whether he is getting better as a result of treatment. These tests, the Dayton scientists state, showed that after the intensive one-day treatment their patients were getting better, whereas the standard qualitative tests would for some time have continued to show a blunt "syphilis positive" and would have led to the assumption that the treatment was without value.

The U. S. Public Health Service, although it is publishing the scientific account of the one-day treatment, does not recommend it for general use. It is watching this and all other speedy methods of treating syphilis with interest, but takes the position that it is too soon to state whether one or the other is the final answer.

The Public Health Service, however, has recommended as standard procedure in all U. S. Marine Hospitals the six-weeks treatment procedure devised by Dr. Harry Eagle and Dr. Ralph B. Hogan, of the U. S. Public Health Service and the Johns Hopkins Medical School. And since the Army and Navy are alert to put into practice all advances in medicine, it would be logical to assume that the shorter treatment proce-

dures will also go into use in Army and Navy hospitals.

Adoption of a short-time syphilis treatment program by the Marine Hospital at New Orleans, according to a story current in New York City, has already led to a great demand among sailors of the merchant marine for a berth on ships bound for New Orleans where, if they had syphilis, they could get treated for it in the shortest possible safe time.

On the six weeks treatment schedule at this and other Marine Hospitals, the patients are given hypodermic injections of 60 milligrams of Mapharsen three times a week for six weeks. Some of them may also be getting weekly injections of bismuth.

The schedule of treatment may be varied to suit the convenience of the patient and the doctor, from twice daily injections of smaller doses of Mapharsen (20 milligrams) for four to eight weeks through various combinations up to three weekly injections for five to ten weeks. Compressing the treatment to less than six weeks in general practice, Dr. Hogan warns, may be dangerous.

First of the speedy syphilis treatment schedules was the five-day drip method inaugurated by Dr. George Baehr, Dr. William Leifer, Dr. Louis Chargin, Dr. H. T. Hyman and associates of New York. With this method the arsenic drug is dropped into the patient's vein, drop by drop, all day long for five days. The treatment is discontinued at night and started again in the morning. Hundreds of patients have now been treated by this method and many of them cured, but the treatment is "many times more dangerous than standard clinic practice," requires the attention of expert doctors and nurses and may only be given to carefully selected patients.

The six-weeks treatment, representing a happy medium between the dangerous five-day drip and the safe, sure but tedious and costly 18 months standard treatment was worked out by Dr. Eagle and Dr. Hogan after experiments with rabbits. The total dose of arsenical drug needed to cure which can safely be given, they found, increases directly with the time over which it is given. The total amount needed to cure syphilis, however, varies slightly with the frequency of doses and length of time over which they are given. The 18 months schedule, it turned out, was safe and sure but wholly arbitrary.

Six weeks of treatment seems, from the early reports, to be as safe as the traditional 18 months. It is too early to say whether it is as effective. A few relapses have been reported, but no more than on the 18 months treatment. The six-weeks treatment has the further advantage over the five-day treatment of being suitable for any patient, and is now being given to those with latent syphilis as well as those in the early stages of the disease.

Further experiments with the one-day treatment, with the hope of showing among other things why 10 hours of fever can overcome the disease in even a few patients treated with relatively small amounts of the arsenical, are being carried on at Dayton by Dr. Kendell. Dr. Simpson and Dr. Rose are now serving with the armed forces.

Science News Letter, September 12, 1942

ZOOLOGY

Mountain Goats Shift Their Home to Black Hills

➤ LIGHT-FOOTED Rocky Mountain goats, found only in the United States and formerly confined to Washington, Idaho and Montana, are now living wild in the Black Hills of South Dakota, it is reported by the Forest Service.

Their new home is entirely accidental. When several of the shaggy game animals were brought to South Dakota for exhibition, two escaped into the hills. Although in a different environment, the fugitive goats have now multiplied to about 25 head.

Science News Letter, September 12, 1942

***SINGLE-CYLINDER TEST** stands are being used at Wright Aeronautical Corporation to speed production of new engines by testing designs in valves, pistons, spark plugs and other parts of the cylinder. Solid plates cover the other cylinder openings in the crankcase. Design features worked out on one cylinder can be applied effectively to a complete engine. This saves time and releases full-sized test cells for use on completed engines ready for installation in planes.*

ENGINEERING

Steam Does Double Duty

➤ BY MAKING steam do two jobs instead of one in the new synthetic rubber plants, electric power will be created, enough not only to run the entire plant and neighboring works, but with some to spare which will be added to the regular public utility lines to help supply other war industries.

This is reported by F. H. Stohr of the Westinghouse Electric & Manufacturing Company, which is making the turbine generators for this purpose.

Steam is plentiful about plants making butadiene and styrene for Buna S rubber, for it is needed in the chemical processes. By passing it first through a turbine and then through the chemical vats, all the necessary chemical work is done and a large amount of power is created as a "by-product," Mr. Stohr said. This power is in excess of the plant's needs, so that instead of taking precious power from the public utility lines, the plants will actually deliver power to them.

Three generators are now being built, one of 35,000 kilowatts, and two of 40,000 kilowatts. They take steam at 750 to 850 pounds per square inch and deliver it to the chemical line at 175 pounds.

These generators, and others to be built, will be installed in the first four large synthetic rubber plants in this country, scheduled for completion in 1943, Mr. Stohr continued. Output of all the Buna S plants at the end of 1943 is expected to be at the rate of 360,000 tons a year, and to approach the 1,000,000 ton-a-year rate in 1944.

Science News Letter, September 12, 1942

PHYSICS

Shooting Electrons

Auxiliary equipment for electron microscope enables scientists to push back frontiers in exploring new field of electron optics. Methods have important war uses.

By DR. MORTON MOTT-SMITH

➤ PHYSICISTS on war fronts of science train four new weapons on our enemies at home and abroad.

Shooting electrons instead of bullets, these laboratory instruments will see service in the sub-microscopic world—that land beyond the reach of ordinary light microscopes.

Results of scouting activities with the new electron miscroscope (magnifying 40,000 times and more) have turned the march of science into new channels of attack. Out of the nation's laboratories have come strange-sounding tales of what was seen on the new frontiers revealed by the electron microscope.

But now new instruments developed for use with the electron microscope not only show physical appearances—they reveal composition and structure of submicroscopic particles. Scientists can also look at impenetrable substances, such as war metals, at gigantic magnifications—a former impossibility.

The first of these instruments is an "adapter" which quickly converts a standard electron microscope into a diffraction camera. By measuring how much the electron particles are turned from their path, or diffracted, by the atoms in the specimen, physicists can piece together how these atoms are arranged in the object observed. This principle has been used in the past apart from the microscope to explore the crystal and molecular construction of matter.

Double Duty

Now by a slight twist of controls, the same instrument which can "see" and take the portrait of even large single molecules, can be used to peer still deeper to reveal the fundamental structure of matter.

The scanning microscope, another new device, "scans" the specimen television fashion. It holds out the possibility that electron microscope pictures will one day be transmitted by radio or wire. Meanwhile, it vastly improves the examination of opaque objects, such as the surfaces of metals, revealing details of enormous importance in providing better metals for our ships, tanks, guns and planes.

An older device for the same purpose has recently been greatly improved. This is based on making a thin plastic replica of the surface, the same principle used to prepare permanent replicas of snowflakes. The copy, being transparent to electron rays, is viewed in the microscope in place of an opaque object, which cannot be used.

The "adapter" and scanning microscope were both developed in the RCA research laboratories.

Electrons "Tire"

The electron spectrometer, another instrument used with the microscope, aids in identifying and determining the composition of the materials examined. It was developed at Ohio State University by Dr. Albert Prebus.

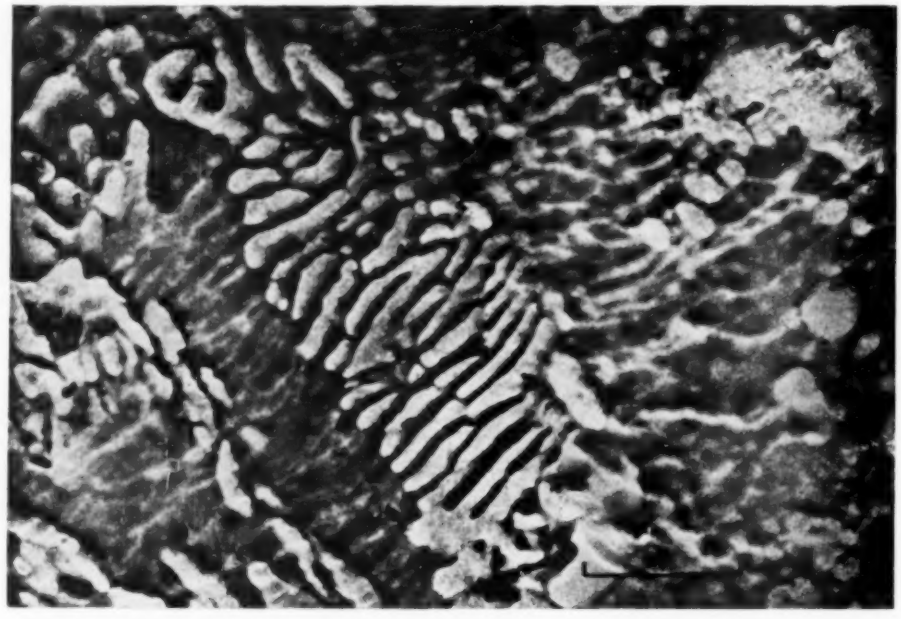
As the electrons are shot through the specimen, some of them get "tired" and lose more energy than others. This depends on the chemical nature of the elements through which they must shoulder their way. This pattern of resultant energies is constant for specific substances and can be used to interpret the composition of the specimen.

Gold and Mosquitoes

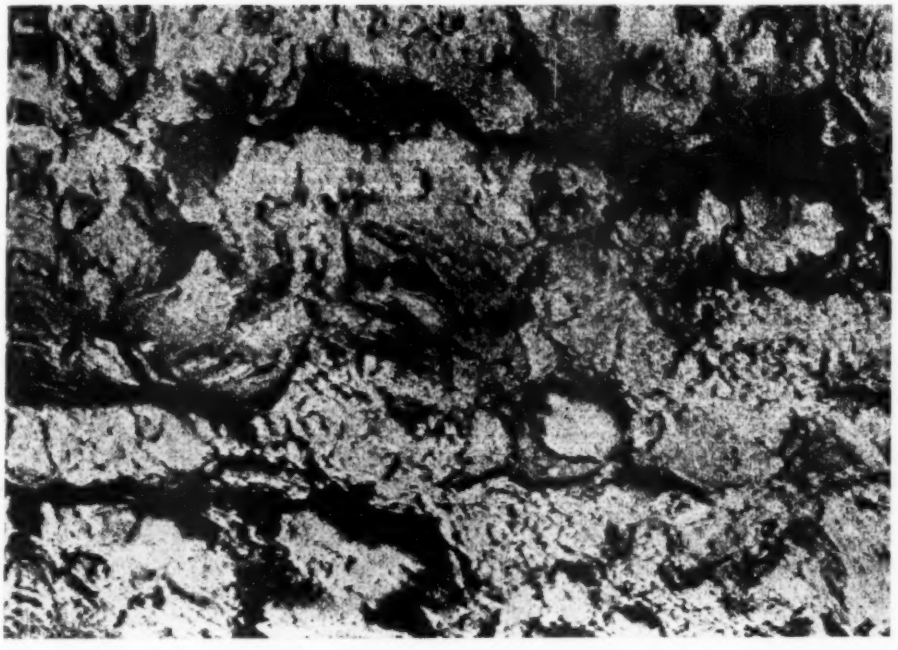
While these four new devices were being developed, the all-seeing eye of the electron microscope was looking at anything and everything that could withstand the vacuum and a shower of electrons—from the breathing tube of a mosquito to colloidal gold particles as small as 1/2,000,000 inch diameter.

There is hardly a field of science where the extra-acute vision of the electron is not of tremendous advantage. Physics, chemistry, biology, medicine, engineering and agriculture, all have benefited. In the scrutiny of metals, clays, plastics, synthetic rubber and other materials astonishing things have been revealed.

Specks of rouge and of some kinds of face powder were found to be as rough and jagged as lumps of coke.



ETCHED STEEL, .4% carbon content, is shown as it appears under the electron microscope using a replica prepared by the "snowflake" technique developed by Vincent J. Schaefer and David Harker at the General Electric research laboratory. The magnification, as shown, is about 25,500 diameters.



***ETCHED NICKEL** is shown in this photograph from the RCA laboratories, as it appears under the scanning electron microscope. The smallest detail visible, measures about two-millionths of an inch. The scanning method was developed by Dr. V. K. Zworykin, Dr. James Hillier and R. L. Snyder.*

Some kinds of smoke particles were like sharp needles. The developed silver bromide crystal in a photographic emulsion looks like a tangled string. Many things were found to look much different than had been expected.

Kaolinite, chief constituent of kaolin, white clay used in chinaware and which can also be used as a source of aluminum, was found to consist of six-sided plate-like crystals instead of the rod-shaped crystals previously supposed. Different clays exhibited a great variety of crystal shapes unrevealed by the ordinary light microscope. More than 2,000 electron photographs have been made of clay particles by Dr. Byron T. Shaw and associates at Ohio State University.

In medicine, the electron microscope revealed the fine internal structure of disease germs. Even the germs themselves can scarcely be seen with a light microscope.

The influenza virus which is of molecular size, and may indeed be a single huge molecule, has also been seen for the first time.

Germicide Action

A recent triumph was the showing of just what happens when a disease germ is attacked by a germ-killing agent such as bichloride of mercury. This was observed by Dr. Stuart Mudd of the University of Pennsylvania, and Dr. Thomas F. Anderson of the RCA Manufacturing Company, and is reported in the Journal of Experimental Medicine.

When a typhoid fever germ is attacked by silver nitrate, the flagellae which serve the germ as propellers are destroyed, the protoplasm becomes black, and the entire germ shrinks. With the chemical lead acetate, however, the germ swells and protoplasm, the life-stuff of the organism, escapes through the cell walls.

Wavelength Shorter

Here is why we can now observe these formerly invisible details by using the electron microscope.

The smallest object that can be seen in any microscope depends on the wavelength of the light or electrons used. The average wavelength of visible light is about 1/50,000 inch. Objects only slightly smaller than that can be seen.

Electrons, although particles, act also like waves and have an equivalent wavelength. This depends on how fast they are going, and this in turn depends on the voltage applied. Thus, 55,000-volt electrons have a wavelength of only about 1/500,000,000 inch.

Electron lenses, however, are not as perfect as optical glass lenses and do not reach anything like the theoretical limit. The smallest objects so far distinguished are about 1/5,000,000 inch in size.

The diffraction camera, into which the electron microscope is converted by means of the "adapter," produces a pattern of concentric circles from which the spacing and arrangement of the atoms in the specimen can be determined.

For the present, the scanning microscope receiver consists of a facsimile printer such as is used for sending pictures by wire or radio. The reason for using this in place of a television receiver is to slow down the scanning rate.

No Response

The trouble with fast scanning is that in this work the beam must be focussed to a submicroscopic point or spot 1/2,500,000 inch in diameter, an extremely difficult job in itself. The area covered by this spot is the smallest detail that will be distinguishable in the magnified picture. At television speeds it was impossible to get enough response from this small spot to affect a receiver.

Even at the slower speed of the facsimile printer, the impulses had to be amplified 1,000,000 times to operate the instrument. This again would have been impossible with any ordinary amplifier, but the electron multiplier, which Dr. Zworykin of RCA has perfected, does the job.

But while the scanning microscope cannot broadcast pictures directly, and perhaps never will, it has been found to be a definitely superior instrument for the examination of opaque objects.

The ordinary electron microscope can use only transparent objects, for the rays must pass through the specimen. Two ways of getting around this have been devised. One is to tilt the opaque specimen so that the rays are grazingly reflected and so pass on to the viewing screen. But this produces distortion.

The other way, already mentioned, is to make a thin transparent plastic replica of the surface, which can then be used in the microscope in the usual way. But this, it is claimed, fails to reproduce the finest details.

Recently, however, the technique of plastic replicas has been greatly improved by the researches of Vincent J. Schaefer and David Harker of the General Electric Research Laboratories, and reported by them in the Journal of Applied Physics.

These scientists found that the best thickness of replica (*Turn to Page 175*)

AERONAUTICS

Flying Fortress Produced Efficiently; Wins Joint E

See Front Cover

➤ FLYING fortresses are leaving the production line for the firing line in ever increasing numbers. The Boeing Aircraft Company's efficient use of manufacturing facilities, including 100,000 special tools designed and built since the beginning of the national emergency has won it the first joint Army-Navy "Production E" award to be made in the aircraft industry.

More pounds of planes are produced per square foot of floor space, it is claimed by the company, than by any other manufacturer in the United States.

Boeing no longer assembles the planes into final form at the earliest possible time, which has been formerly the general practice in the industry. Instead, it completes major sections. Then at the final assembly station, there is little to do but join the sections and connect the wires and tubes. Thus the bulky completed plane occupies factory space for the shortest time possible.

Science News Letter, September 12, 1942

RESOURCES

Moonshiners Substitute Wild Honey for Sugar

➤ UNABLE to get sugar, moonshiners in the jungles of Florida have turned to wild bees' honey to mix with their corn mash. And they are utilizing a thoroughly modern method to find the hives. It is apparently inspired by the battleplane gunner's tracer bullets.

First the moonshiner catches a bee sampling a tempting dish of sugared water put out for her, or while her head (and stinger) is deep in a flower. He next sprinkles flour on her and sets her free. The bee makes for home, leaving a 200-foot streak of "white smoke" behind. This gives the hunter the direction of a hive.

In fairly open country he can follow the white trail some 300 yards, in thick brush. Then he again entices a returning bee with his sugar lure, and flours her into another tracer. Repeating this performance half-a-dozen times or so, the moonshiner will at last come upon the hive. If the hive is within reach he will smoke the bees away and rob them of their honey.

Sometimes it is necessary to chop down a tree in order to get the hive. This is a more dangerous proceeding. Much smoke is needed to ward off the disturbed and annoyed workers.

Secured in this way, honey is a cheap substitute for sugar. Bought legitimately at wholesale, honey fetches on the average $1.25 a 12-pound gallon.

Wild bees produce a large amount of honey per colony, the average being 100 pounds. In the mangrove region the average is around 150 pounds. As much as 400 pounds have been taken from an old colony.

Heavy June rains spoiled this year's early summer flow. Now the bees are working on black mangrove, partridge-pea and pepper-bush. Word from the back country is that corn is scarcer than honey.

Science News Letter, September 12, 1942

CHEMISTRY

China Gets Gasoline And Rubber from Tung Oil

➤ SYNTHETIC gasoline and rubber from tung oil are the objects of experiments now being carried out in China at the National Bureau of Industrial Research headed by Dr. Ku Yu-tsuan, as reported in "China at War."

Dr. Ku reports that he can get one-third of a quart of gasoline from one quart of tung oil, and that the experiments with synthetic rubber are "fairly encouraging." The Chinese are already distilling alcohol from molasses, wood, corncobs, and other foodstuffs, and expect to get 11,000,000 gallons from these sources to run their motor vehicles.

Science News Letter, September 12, 1942

PLANT PATHOLOGY

Fungus Kills Oak Trees; Parasite Unidentified

➤ CAUSE of a destructive disease that has been killing oaks in southern Wisconsin has been identified by Dr. A. J. Riker of the University of Wisconsin, as a parasitic fungus. Dr. Riker and his assistants inoculated 37 healthy oaks with the fungus. Nearly half of them showed the wilt symptom characteristic of the disease, and the fungus was found growing in three-quarters of the inoculated trees. The specific identity of the parasite has not yet been determined; nor have practical control means been developed. Plant pathologists are now at work on the problem.

Science News Letter, September 12, 1942

IN SCIENCE

INVENTION

Poison Gas Detector Developed for Defense

➤ FOR CIVILIAN DEFENSE against possible gas attacks, a portable detector has been devised by members of the Western Connecticut Section of the American Chemical Society. The detector, which one or two men can carry, is composed of a five-gallon closed container filled with water. When the water is allowed to run out at the bottom, air is drawn in at the top. This air passes down four tubes and through chemical solutions or over test papers for detecting poison gases. Four tests can thus be made at once. A supply of these solutions and papers is carried in a separate kit. Tests can be made for mustard gas, phosgene, Lewisite, chloropicrin, chlorine, carbon monoxide, and other gases.

Science News Letter, September 12, 1942

MEDICINE

Wool for Kenny Treatment Available from Foundation

➤ INSTITUTIONS treating infantile paralysis patients by the Kenny method can now get 100% wool material for the treatment from the National Foundation for Infantile Paralysis in New York.

Wool pieces, which can also be made from old woolen blankets, are used for the hot fomentations or packs that are placed over the muscles that are in "spasm." The number of old woolen blankets that can be cut into pieces in these days of restrictions on purchase of new woolens is, however, limited.

The woolens which the Foundation announces it can now supply are used as paper mill felts and their availability has been made possible "through the fine spirit of cooperation of the National Paperboard Association and its individual mill members."

The wool will be shipped by the National Foundation, without cost except express charges, in lots of 50 to 100 pounds, which it is stated should be enough for several patients.

Science News Letter, September 12, 1942

NCE FIELDS

DENTISTRY

Teeth As Well As Brain May "Black Out" in Dives

➤ NOT JUST his brain, but a pilot's teeth as well may "black out" when he pulls out of a power dive. The suggestion is made by Capt. Herbert J. Lipson, M.C., U.S.A., and Dr. S. G. Weiss, Muskogee, Oklahoma, dentist (*Journal, American Dental Association* Sept. 1).

The centrifugal force which pulls the blood away from the pilot's brain, causing the familiar "black out" symptoms, would also pull the blood out of the pulp of his teeth, they point out. They add that the absence of any recoil mechanism in the "hard, unyielding wall of dentin" surrounding the tooth pulp makes it unlikely that recovery from a "black out" in the tooth would be "so efficient or so nearly complete as in the brain." Permanent damage or death of the tooth might result.

Extreme cold at high altitudes and the "bends" to which aviators as well as divers are subject might also cause injury of the tooth pulp.

Capt. Lipson and Dr. Weiss urge dentists to investigate more fully the effects of flying on the teeth as physicians are now studying its effects on other parts of the body.

Science News Letter, September 12, 1942

ENTOMOLOGY

Ticks on Birds Suggests Winged Carriers of Fever

➤ AERIAL SPREAD of two dangerous diseases, rabbit fever (tularemia) and Rocky Mountain spotted fever, is now suspected as a result of a discovery by Charles R. Joyce, Iowa State College entomologist, and Gaines W. Eddy, now of the U. S. Bureau of Entomology and Plant Quarantine.

These scientists found the nymphs and larvae of the common rabbit tick on 29 kinds of birds examined at the Tama Indian Reservation in Iowa.

Although rabbit ticks rarely attach to man, and are therefore not directly responsible for transmitting the diseases, it is believed they spread the diseases among rabbits. From this reservoir of infection the diseases may spread naturally to other species of ticks, such as those which carry spotted fever.

On one brown thrasher the entomologists found 495 young rabbit ticks, and a total of 2,111 were removed from 24 of these common song birds.

Hosts for the young rabbit ticks were found to include also the catbird, indigo bunting, wrens, towhee, robin, and other species of ground-feeding birds.

Among the 14 kinds of ticks collected in Iowa were several species not previously reported in Iowa. *Amblyomma ovale,* found on a dog, is native to South America and has not been reported previously in this country.

Science News Letter, September 12, 1942

ZOOLOGY

Zoo Accepts House Pets As Animal Imports Cease

➤ BEFORE the war, it was most unusual for the authorities at Edinburgh Zoological Gardens to accept pet animals or birds that had lived in private houses, but now that wild animals can no longer be imported from abroad, this rule has been relaxed, particularly in the case of monkeys, since these little creatures are seldom bred in captivity and are consequently becoming scarcer every year in Britain.

Science News Letter, September 12, 1942

CONSERVATION

Food Shortage Emphasizes Need for Proper Storage

➤ HOUSEWIVES more than ever these days need to learn how to store foods so they will keep, as a patriotic duty, as well as a duty to the family pocket book.

One shrivelled carrot, one slice of moldy bread seem like a trifling loss. But, as the U. S. Bureau of Home Economics points out, such trifling losses multiplied by the nation's 34,000,000 homes mounts to a staggering and important total. Thirty-four million slices of bread, 34,000,000 fresh carrots can help nourish many families and many fighting men.

Remember that mold breeds more mold, and that weevils breed weevils. Store food properly and check up frequently on food storage places to keep mold or weevils that have started from making too great headway.

Science News Letter, September 12, 1942

CHEMISTRY

New Plastic Used to Make Tableware for Air Travel

➤ LIGHTWEIGHT tableware for serving hot meals on airplanes is being made from a new plastic, melamine combined with cellulose pulp. While melamine resin is one of the newest plastic materials, introduced in 1939, it is also one of the oldest. It was discovered by Liebig in 1834, who also gave it its name. But nothing was done with it. The resin is composed entirely of carbon, nitrogen and hydrogen, and is being economically made now from calcium cyanamide. It melts at 670 degrees Fahrenheit.

The new plastic is hard, durable, resistant to alkalies, weak acids and the ordinary solvents, and is an excellent insulator. These properties combined with its high resistance to heat make it suitable for electrical uses, particularly lighting fixtures, handles for hot pans, etc. It is made by the American Cyanamid Company of New York, but the manufacturer states that little will be available for civilian use until after the war emergency is over.

Science News Letter, September 12, 1942

INVENTION

New Machine Developed To Remove Beet Tops

➤ A MACHINE for cutting the tops off sugar beets is the invention of Arnold W. Kolstad of Seattle, Wash., who has received U. S. patent 2,294,348.

The sugar beet usually extends somewhat above the ground and this part becomes hard and bitter and must be removed along with the stem and leaves. No machine has hitherto been devised that would cut the beets at a uniform distance below the base of the stem, the inventor states. The work was done by men with knives, was slow, expensive, and with the present shortage of labor may sometimes be impossible.

Mr. Kolstad's machine grasps the leaves and lifts the beet from the ground, after the latter has been loosened by the plow, and moves it between a pair of sloping prongs which guide the cutters to the precise place where the beet is to be cut. The lower part of the beet is also grasped and deposited in one place while the severed leaves and top are deposited in another.

Science News Letter, September 12, 1942

From Page 163

tastes to which the person who eats them, needs to become accustomed, Dr. Zucker stated. Cottonseed flour makes a yellower loaf than most of us are used to. On the other hand, it is very cheap—five cents a pound on the current market. Peanut flour offers less difficulty so far as taste is concerned, but its price is considerably higher.

The Doctors Zucker made up test batches of bread out of various mixes of these seed flours with wheat flour and tried them out on rats, which throve very well on them, needing no other source of proteins. They also got sufficient quantities of two necessary vitamins, thiamin and riboflavin, from the seed flours.

Science News Letter, September 12, 1942

New Sugarcane Byproducts

➤ ANOTHER BYPRODUCT of agricultural industry that may find profitable use through chemical handling is bagasse, the woody waste left after the sugary sap has been chrushed out of sugarcane. Prof. Donald F. Othmer and George A. Fenstrom of the Polytechnic Institute of Brooklyn told the members of the American Chemical Society of their experiments with this material.

From a ton of dry bagasse, heated in a dry still, they obtain 35 pounds of acetic acid, one and one-third gallons of crude methanol (wood alcohol) and 750 pounds of charcoal. The acetic acid and methanol are in large demand as industrial solvents, and charcoal is a familiar domestic fuel in the warm lands where sugarcane is grown. The experimenters pressed it into briquets for marketing.

Science News Letter, September 12, 1942

New Vanadium Process

➤ VANADIUM, strengthener of steel for war, is now being extracted by a new process from Idaho phosphate rock used in fertilizer manufacture. It is estimated that half a million tons of vanadium can be recovered from the 5,700,000,000 tons of phosphate rock in sight in this deposit.

The extraction process was described before the meeting of the American Chemical Society by Dr. J. Perry Morgan, chemical engineer of the Standard Oil Company of New Jersey, who developed it under the direction of Prof. Arthur W. Hixson of Columbia University.

The phosphate rock is first treated with sulfuric acid, the solution concentrated by evaporation, and then treated with nitric acid. The vanadium is precipitated as vanadyl phosphate, and the phosphoric acid is filtered off to be used in the making of fertilizer.

The vanadyl phosphate is subjected first to live steam, then treated with ammonia gas and ammonium nitrate, which converts it into ammonium vanadate. The ammonium is driven off as ammonia gas by heat, leaving a residue of vanadium pentoxide, which is the form in which vanadium is supplied to the steel industry.

Science News Letter, September 12, 1942

Methods of Dehydrating

➤ DEHYDRATING vegetables is not simply a matter of peeling and slicing them and tossing them into the drier. There are a lot of tricks to the trade, and ignorance or neglect of them will produce the inferior products that gave dehydration such a black eye during World War I and delayed its progress by a decade or more. At the meeting of the American Chemical Society in Buffalo, Dr. W. V. Cruess of the University of California told of some of the things that must be done if dehydrated vegetables are to be really good.

First of all, the vegetables must be garden-fresh. Keeping them for any length of time results in a loss of vitamin C, he said. Then they must be blanched, that is thoroughly scalded in hot steam, to stop the action of their own enzymes which will spoil both quality and color if they are allowed to continue their activities within the cells. The practical dehydrator has to know certain necessary facts about plant physiology, and apply them.

Dehydration temperatures can be high at the beginning, while the vegetables still have full moisture content, because the water absorbs the heat. But near the end, the temperatures must be kept to a safe, low level.

Even after the job is finished, there are still troubles to contend with, Dr. Cruess told his listeners. Insects love dehydrated foods, and will chew through anything but metal or glass to get at them. They are highly absorbent toward atmospheric moisture, and likely to spoil in contact with oxygen, which again calls for special protective measures.

Science News Letter, September 12, 1942

Frozen Foods in Demand

➤ WHILE FOOD dehydration is attracting great attention because the products can be so compactly shipped for overseas use, quick-freezing of fish, meat, fruits and vegetables for home consumption is not being neglected. Frozen fish is in such great demand, Domenic DeFelice, of the New York State Agricultural Experiment Station, told the meeting, that hitherto unused species have had to be added to haddock, flounder and other first favorities for filleting. The frozen berry industry in the Pacific Northwest has about reached its limit, but is expanding elsewhere in the country. Boned and packaged meats are being frozen in large quantities for Army use.

Science News Letter, September 12, 1942

Approximately 50% of the annual *poultry* loss from disease is due to fowl paralysis.

● RADIO

Saturday, September 19, 1:30 p.m., EWT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. O. E. May of the Bureau of Agricultural Chemistry, United States Department of Agriculture, will discuss "Use of Agricultural Products in Industry."

Tuesday, September 15, 7:30 p.m., EWT

Science Clubs of America programs over WRUL, Boston, on 6.04, 9.70 and 11.73 megacycles.

One in a series of regular periods over this short wave station to serve science clubs, particularly in the high schools, throughout the Americas. Have your science group listen in at this time.

"Do you mean to say I have these things in my gas tank?"

YES, Lieutenant. Millions of them are mixed with your gasoline to give your plane more speed and power. What you have in your hand is a chemist's model—100 million times life size—of a molecule of one of the ingredients of Ethyl fluid.

Ethyl fluid is put into gasoline by refiners to boost its antiknock quality (octane number). Today it is used in the production of practically all gasoline used by American air and mechanized forces.

A single molecule like the one you are looking at can control the combustion of nearly 100,000 molecules of fuel and air inside an engine. By blending Ethyl fluid with the superior fuels produced through modern petroleum chemistry, refiners are today producing large quantities of high-octane gasoline. This, in turn, permits engine designers to build high compression and supercharged engines that squeeze more power from every drop of fuel and do more work for every pound of engine weight.

Ethyl engineers have for years assisted the technologists of the petroleum, aviation and automotive industries in their search for better fuels and engines. Today it is our privilege to offer our product, our experience and our research facilities to the cause of American victory.

ETHYL CORPORATION
Chrysler Building, New York City

Manufacturers of Ethyl fluid, used by oil companies to improve the antiknock quality of aviation and motor gasoline.

ARCHITECTURE

Troops Build Igloos

➤ IF YOU'RE worrying about keeping the house warm this winter, just stop a moment, unwrinkle your brow, and give a thought to the soldiers who'll be out on patrol when winter settles down over inland Alaska. Some of them will be sleeping in snow igloos.

A new Army manual for the use of soldiers who must make war in snow and extreme cold, discussed in the new issue of the *Infantry Journal* (September) tells among other things how to build a dome-shaped snow house of the most approved Eskimo architecture.

The only tool needed is a long knife, the instructions state. A bayonet will do, although a slightly longer blade is better. A shovel for handling soft snow, however, is a good thing to have along. Snow should be firm and well-packed, but neither too warm nor too cold. If too warm, it gets "thawy" and won't stand up. If too cold, it tends to become a mass of loose ice granules, too porous to keep out the wind, and too good a conductor of heat to keep in the warmth.

The house should not be built on firm, bare ground: that's too cold. A floor of snow is needed to insulate the house from the cold earth as well as snow walls to keep in the warm air. The igloo, therefore, should be built on fairly deep snow.

Best size for snow blocks is about 36 inches long, 18 inches wide and five inches thick. Set the first course of blocks on edge in a circle, slicing down the upper corners a little so that they will lean slightly inwards. Working from inside the circle, set the next course upon this, again with the slight inward slope. A second worker follows around the courses as you build, chinking cracks with loose snow. Loose snow may be piled well up against the side walls.

Getting the last block into place on the top of the dome is something of a trick. Trim the last, irregular hole left at the top into an even shape, slip a suitably sized block out through it endwise, turn it and lower it over the hole like a lid. Then trim edges until it fits neatly into place. A ventilating hole is cut in the roof afterwards. As a touch of luxury, slip a wooden stovepipe through this.

You have now walled yourself entirely in. A door is cut by tunneling through the drift under the wall. Thus, the entrance is through a trench below the general snow level. The door, left open, and the chimney-hole in the roof, furnish good ventilation.

Four men can put up such a snow house in about an hour. And it's much cosier than any tent, for an overnight bivouac under Arctic conditions.

Science News Letter, September 12, 1942

GEOLOGY

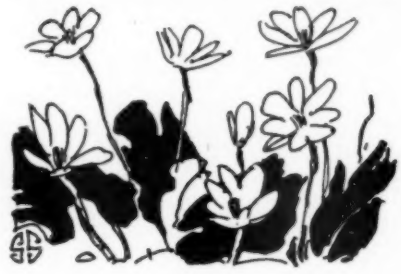
Russians Report Discovery Of Mineral Deposits

➤ USSR GEOLOGISTS prospecting in Siberia have discovered new iron ore deposits, copper deposits richer than the famous Urals mines, manganese, aluminum, lead, zinc, tungsten, molybdenum, tin, antimony, bismuth, mercury, rare metals, oil, asbestos, mica, graphite and various building materials. Newly discovered gold fields have advanced the Soviet Union from seventh to second place in the world in gold mining. In the United States, nearly all of these materials are under priority ratings.

Science News Letter, September 12, 1942

GENETICS

NATURE RAMBLINGS
by Frank Thone



Colchicine's Competitor

➤ COLCHICINE, the "evolution chemical" that doubles chromosome numbers in plant cells and produces new and sometimes giant varieties, now has a rival in a compound known as sanguinarin.

Doubling of the chromosome count in the cells of the summer flower-garden favorite, snapdragon, by treatment with a two-tenths per cent solution of sanguinarin is reported by Thomas M. Little of the U. S. Department of Agriculture's great experiment station at Beltsville, Md. (*Science*, Aug. 21).

Mr. Little treated snapdragon plants with a similar solution of colchicine, and left others untreated, as controls. He obtained approximately the same percentage of positive results from both colchicine-treated and sanguinarin-treated plants. The only difference was that the leaves of the sanguinarin-treated plants did not have the roughened and wrinkled appearance that follows the use of colchicine on most plants.

It seems probable that the chromosome-doubling effects of sanguinarin extend to other plants as well, for in preliminary experiments on severed tips of lily roots certain of the chromosomes were observed to be shortened and split.

Like colchicine, sanguinarin is a drug of plant origin. It is obtained from the rootstocks of the beautiful early spring flower, bloodroot. The scientific name of bloodroot is Sanguinaria, whence the designation of the drug. It is listed in the medical dictionaries as a medicine for coughs and stomach ailments, and in higher concentrations is poisonous. It is, however, not very widely used at present for medicinal purposes.

Science News Letter, September 12, 1942

INVENTION

Crushed Rock Material Puts Out Incendiaries

➤ A METHOD of extinguishing burning magnesium which requires neither stream, jet nor spray of water is described in U. S. patent 2,294,532, granted to Joseph J. Fahey and Michael Fleischer of Washington.

The inventors have assigned all rights to the U. S. Government without payment of any royalties to themselves.

The method described is to cover the bomb with a crushed rock material which melts at the temperature of burning magnesium (1,800 degrees to 2,700 degrees Fahrenheit) and forms a highly viscous but glassy layer which completely excludes access of air to the bomb.

The inventors give a long list of rock materials, which they call "vitrescible" minerals, which meet these specifications —but the best of them is feldspar. They are cheap and abundant. They also list a number of artificial inorganic "vitrescible" minerals.

To extinguish a bomb, they direct, it is first necessary to wait until the thermite core has burnt itself out, for this like an explosive provides its own oxygen. Then with a long-handled shovel the bomb is covered with the vitrescible material. About 40 pounds of it, which can be carried in a 12 quart bucket, will extinguish a two or four pound bomb, in 15 to 30 seconds, according to their experience.

Other materials that have been used for smothering bombs are unsatisfactory the inventors say. Sand permits air to enter, and only prevents the fire from spreading while the bomb burns itself out. Clays and the like contain water which aggravate the fire instead of extinguishing it, while bituminous and resinous materials are themselves combustible and evolve an acrid smoke.

Science News Letter, September 12, 1942

INVENTION

Beryllium and Lithium Prevent Alloy Oxidation

➤ HOW SMALL amounts of beryllium and lithium, from about 0.001% to about 0.02%, added to aluminum-magnesium alloys will prevent oxidation of the magnesium and the formation of dross on the surface of the metal when melted, is revealed in U. S. patent 2,293,864 issued to Philip P. Stroup of New Kensington, Pa. The rights have been assigned to the Aluminum Company of America.

The oxidation and the formation of dross carry away a good deal of the precious magnesium. The use of beryllium and lithium not only prevent this waste but also obviate the use of protective fluxes or an inert atmosphere above the molten metal.

While the inventor prefers equal quantities of the two metals, he says that in some cases the amount of lithium can be increased and the amount of the more expensive beryllium decreased so long as the total amount is kept the same. (Beryllium costs about $15 a pound).

Beryllium is slightly heavier than magnesium and both are about two-thirds as heavy as aluminum. Lithium is the lightest metal known, being only slightly more than half as heavy as water. It therefore floats like wood. In fact many hard woods are heavier than lithium. Both of these metals act as hardeners to aluminum alloys. Yet while beryllium itself is hard, lithium is soft.

Science News Letter, September 12, 1942

New Machines and Gadgets

SHELL CASES are now being made of steel instead of the more precious brass by means of the same machinery previously used for the brass cases. This has made it possible to reach the mass production stage at once.

Science News Letter, September 12, 1942

PUSH BROOM AND SCRAPER combined are provided in a recent patent. Just turn the broom over and the scraper will remove that recalcitrant bit that could not be budged by the bristles. Most such brooms have two openings into which the handle can be threaded, so that the broom can be reversed when one side is worn. The device screws into the spare opening and so may be instantly applied to any such broom.

Science News Letter, September 12, 1942

A PAIR OF FLASHLIGHT BULBS carried by a spectacle frame but worn on the forehead above the eyes, is an invention recently patented. The inventor recommends it for use of surgeons and others who have to work during blackouts with only flashlight illumination. A long downward projecting nosepiece keeps the lamps sitting high. The battery is carried in the pocket or elsewhere on the person.

Science News Letter, September 12, 1942

COOLING THE AIR blown by an electric fan is the object of a recently patented invention. A box-like container above the fan contains dry ice. The cold air and gas in this container is drawn down through a series of vertical tubes behind the fan and returns to the box through an outside horseshoe-shaped tube. The circulation is maintained by a propeller inside the box. The propeller is driven by a little windmill on the lower end of a shaft that projects downward into the air stream of the fan. The inventor claims that the device can be attached with little difficulty to standard makes of fans.

Science News Letter, September 12, 1942

MANY SMALL MOTORS are required on an airplane, particularly a war-plane, for operating controls, protective devices and other purposes. Weight and space must be reduced to a minimum without sacrificing reliability of operation. The electric motor illustrated weighs only 8 ounces, is less than 4 inches long and 2 inches in diameter.

Included in the case is a gear to reduce the speed to 125 revolutions a minute. Other light-weight gears are provided which may reduce the speed to as low as one revolution per minute, or the motor may be made without gears.

Science News Letter, September 12, 1942

If you want the sources of the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 121.*

CHEMISTRY

Wool Resembles Rubber In Molecular Structure

➤ WOOL resembles rubber, perhaps not in external appearance, and we may expect no woolen tires. But its molecule resembles that of rubber and it is this circumstance that gives wool its elasticity.

When wool is bent it springs back again. When cotton is bent it stays bent. That is why the crease in all-wool trousers stays put for a time, while a cotton shirt gets wrinkled and stays wrinkled. This elasticity also accounts for the warmth of wool, for the fabric remains porous with innumerable small air spaces. Cotton, on the other hand, packs down and loses the insulating air spaces. These facts were brought out by research associates of the Textile Foundation who have been conducting researches on wool at the National Bureau of Standards.

Science News Letter, September 12, 1942

Books Just Off the Press

ADAPTING FRUIT AND VEGETABLE PRODUCTS TO WAR NEEDS—W. V. Cruess, M. A. Joslyn and Gordon Mackinney—*Univ. of California Press,* 38 p., 25c.

ALL ABOUT BROADCASTING — Creighton Peet—*Knopf,* 67 p., illus., $1.75.

ANNOTATED GEOLOGICAL BIBLIOGRAPHY OF VIRGINIA—Joseph K. Roberts—*Dietz Press,* 482 p., $7.50, paper $5.

ATLAS OF THE SCALE INSECTS OF NORTH AMERICA—(Ser. 4)—Gordon Floyd Ferris—*Stanford Univ. Press,* various paging, illus., $6.75, unbound $5.75.

BASIC RADIO; THE ESSENTIALS OF ELECTRON TUBES AND THEIR CIRCUITS — J. Barton Hoag—*Van Nostrand,* 379 p., illus., $3.25.

BIRDS AROUND NEW YORK CITY—Allan D. Cruickshank—*American Museum of Natural History,* 489 p., illus., $1.75.

A BRAND NEW BABY—Margaret A. Stanger—*Beacon,* 132 p., illus., $1.75 (Juv.)

CHEMICAL GARDENING—D. R. Matlin—*Chemical Publishing Co.,* 159 p., illus., $2.25.

CIVIL DEFENSE IN WAR—Mrs. Anthony Billingham — *Transatlantic Arts,* 72 p., $1.80 (Britain at war series).

THE CODEPODS OF THE PLANKTON GATHERED DURING THE LAST CRUISE OF THE CARNEGIE—Charles B. Wilson—*Carnegie Institution of Washington,* 237 p., illus., $2.50, paper, $3.50, cloth.

THE DYNAMIC STATE OF BODY CONSTITUENTS — Rudolf Schoenheimer — *Harvard Univ. Press,* 78 p., $2.

FACTS FOR CHILDLESS COUPLES—E. C. Hamblen—*Thomas,* 103 p., diagrs., $2.

A HANDBOOK OF ALLERGY FOR STUDENTS AND PRACTITIONERS — Wyndham B. Blanten—*Thomas,* 190 p., illus., $3.

HANDBOOK SUPPLEMENT TO SPECIAL LIBRARIES: PART 2 MEMBERSHIP LIST — (Vol. 33, no. 2) — *Special Libraries Ass'n.,* 78 p., $1.

HOME CANNING FOR VICTORY — Anne Pierce—*Barrows,* 106 p., illus., $1.25.

INDUSTRIAL CHEMISTRY (4th ed.)—E. R. Riegel—*Reinhold,* 861 p., illus., $5.50.

MEMORABLE DAYS IN MEDICINE—Paul F. Clark and Alice Scheidt—*Univ. of Wisconsin Press,* 305 p., illus., $2.

MICROBIOLOGY AND MAN—Jorgen Birkeland—*Croft,* 478 p., illus., $4.

MICROWAVE TRANSMISSION—J. C. Slater—*McGraw-Hill,* 309 p., $3.50.

MODERN SANITARY ENGINEERING—George Eric Mitchell—*Chemical Publishing Co.,* 169 p., $5.

1000 PICTORIAL SYMBOLS — *Pictograph Corporation,* 56 p., $2.

PLANE TRIGONOMETRY, SOLID GEOMETRY AND SPHERICAL TRIGONOMETRY—Walter W. Hart and William L. Hart—*Heath,* 124 p., $2.60 with tables, $2.35 without tables.

PUBLIC RELATIONS FOR HIGHER EDUCATION—Stewart Harral—*Univ. of Oklahoma Press,* 292 p., illus., $3.

THE RISE OF MAMMALS—George Gaylord Simpson—*American Museum of Natural History,* 21 p., illus., 25c.

SPITFIRE! THE EXPERIENCES OF A FIGHTER PILOT—B. J. Ellan (pseud.)—*Transatlantic Arts,* 110 p., $1.50.

TABOO, A SOCIOLOGICAL STUDY — Hutton Webster—*Stanford University Press,* 393 p., $4.

THEATRES OF WAR: INDIA, 18 p., AUSTRALIA AND NEW ZEALAND, 16 p., THE NORTH PACIFIC, 19 p., — Institute of Adult Education—*Teachers College, Columbia Univ.,* Series of 3 titles, 40 ea., single copies, 15c.

THE TRIUMPH OF MAMMALS—Edwin H. Colbert—*American Museum of Natural History,* 15 p., illus., 25c.

WAR MEDICINE, A SYMPOSIUM—Winfield Scott Pugh, ed.—*Philosophical Library,* 565 p., illus., $7.50.

WEBSTER'S DICTIONARY OF SYNONYMS—*G. & C. Merriam Co.,* 907 p., $4 with thumb index, $3.50 without thumb index.

WHAT THE CITIZEN SHOULD KNOW ABOUT SUBMARINE WARFARE—David O. Woodbury—*Norton,* 231 p., illus., $2.50.

WHITE BOOK OF THE U. S. FOREIGN POLICY, 1932-1942—Committee for National Morale—*Authentic Publications Co.,* 48 p., 25c.

WOOD AND CHARCOAL AS FUEL FOR VEHICLES—R. Ruedy—*National Research Council, Canada, Research Plans and Publications Section,* 106 p., plates, $2.

• Glances at New Books •

➤ THROUGH the concept of function, algebra, trigonometry, analytic geometry and the elements of calculus are united to a complete college course in BASIC COLLEGE MATHEMATICS, A GENERAL INTRODUCTION, by Carl Wallace Munshower and James Fletcher Wardwell (*Henry Holt*). For those who wish to pursue mathematics further, the book may serve as an introduction.

Science News Letter, September 12, 1942

➤ BY FIRST pointing out the uses of mathematics in our social and industrial life, the authors of LIVING MATHEMATICS, G. M. Ruch, F. B. Knight and G. E. Hawkins (*Scott, Foresman & Company*), aim to make the study of arithmetic more interesting and useful to young children. Intriguing "Side-Trips in Mathematics" give the brighter child a chance to exercise his wits.

Science News Letter, September 12, 1942

From Page 167

is much thinner than has been used before. It lies between 1/500,000 inch, which is 1/10 the wavelength of yellow light, and 1/300,000 inch.

If thinner than this, the contours on the bottom of the film, next to the metal, will be repeated in less degree on the top surface, and the picture will lack details and contrast.

If thick beyond the flat part of the top surface, there will be extra material on top which will dim and wash out the picture. This technique which Mr. Schaefer originally developed for the preservation of snowflakes will now add its bit to this formidable array of laboratory methods for helping the war effort.

Science News Letter, September 12, 1942

On guard against Electrical Blackouts

A blinding flash! A short circuit! The saboteur *thinks* his work is done . . . and it would be, but for the giant circuit breakers that stand guard over America's power lines.

For, without fast-acting circuit breakers, a short circuit in a substation would melt the power lines in an instant. Transformers and huge electric generators would be damaged or destroyed. Power would be disrupted for days or weeks. Vital war work would be brought to a standstill.

Recently, Westinghouse Research Engineers developed radically new types of circuit breakers. These improved devices break the circuit in a shorted power line at the incredible speed of *one twentieth of a second.*

Then a problem arose. How could Westinghouse scientists be *sure* these new circuit breakers would cut off the power quickly enough . . . in the split second that spells the difference between protection and disaster?

SOLUTION: the mammoth Westinghouse High Power Laboratory where torrents of electric power . . . equivalent to the smashing force of 75,000 thunderbolts . . . are made to order.

Here, two 500-ton electric generators build up power of an instantaneous value of 2,000,000 kw. This surge lasts only a few seconds but, during that time, develops *twice the power* generated at Niagara Falls!

This terrific force is discharged into a new Westinghouse oil circuit breaker, to test its efficiency in protecting America's power systems. In a fraction of a second, the short circuit is blotted out . . . with no harmful effect upon generators, transformers, or other electrical equipment.

Outdoor type air-blast circuit breakers are tested in insulated cells, at temperatures ranging to 20 degrees below zero. Although coated inch-deep in ice, these breakers operate perfectly under a flood of power 30 times greater than the normal power-line load.

Out of the Westinghouse High Power Laboratory have come many improvements in circuit breakers, giant fuses, and power switches . . . guardians of power lines against enemy sabotage, possible aerial bombing, and accidental short circuits.

Thus does Westinghouse "know how" help keep power flowing into America's mighty war industry upon which our very survival depends.

Westinghouse

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